Original Article

Significance of Various Diagnostic Methods for the Detection of Helicobacter Pylori Infection

Rasheed Ahmed Soomro, Muhammad Kaleem, Riaz Ahmed Qazi, Faisal Irshad, Mehwish Zafar, Moin-ul-Islam

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2%-(&7,9(7R GHWHUPLQH WKH GLDJQRVWLF VLJQLILFDQFH RI +HOLFREDFWHU SY
KLVWRORJLFDO H[DPLQDWLRQ RI WLVVXHV DQG UDSLG ,PPXQRFKURPDWR
0(7+2'2/2*< 7KLV UHWURVSHFWLYH FRPSDUDWLYH VWXG\ ZDV SHUIRUPHG
DQG 0HGLFLQH 6XOHPDQ 5RVKDQ 0HGLFDO &ROOHJH 7DQGRDGDP IURP
KXQGUHG FDVHV FROOHFWHG E\ FRQVHFXWLYH QRQSUREDELOLW\ WHFKQ
RSLQLRQ RI + S\ORUL GLVHDVH 6DPSOHV ZHUH FROOHFWHG DQG JDVWU
DOO FDVHV LQ WKH GHSDUWPHQW RI 0HGLFLQH DQG VKLIWHG WR WKH
SURFHVVLQJ 7KH UDSLG ,PPXQRFKURPDWRJUDSKLF DVVD\ RI WKH VDP
LVRODWH + S\ORUL IURP IDHFDO VDPSOHV $OO WKH GDWD 3RROOHFWHG
DQG WKH UHVXOWV ZHUH WDEXODWHG
5(68/76 2Q KLVWRORJLFDO H[DPLQDWLRQ + S\ORUL EDFLOOL ZHUH GHWH
PDOH ZDV 7KH DJH UDQJH RI WKH 2LWK D PHDQ 7KH RI KLVWRSDWKRORJL
SRVLWLYH FDVHV ZHUH FRPSDUHG Z+LWK V\QRQRJHQRXV VWUDLQV RQ
LPPXQRFKURPDWRJUDSK\ WHFKQLTXH LQ VXEMHFWV 7KH VHQVLWL
ZHUH DQG UHVSHFWLYHO\ DQG WKH 3
&21&/86,21 + S\ORUL SRVLWLYLW\ LV KLJKO\ VLJQLILFDQW LQ KLVWRORJL
ELRSVLHV DQG PD\ EH LGHQWLILHG E\ VWRRO DQDO\VLV DV VHQ LQ V
VWUDLJKWIRUZDUG DQG KDV ORZ H[SHQVHV

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6LJQLILFDQW DWWHQWLRQ RFFXUV LQ WKH GHYHORSLQJ FRXQWULHV RQ PLFURELRORJ\ DIWHU OLQNHG WR RWKHU DVSHFWV RI µ&DPS\OREDFWHU¶ LVRODWHG IURP JDVWULF ELRSV\ IURP JDVWURHQWHURORJLF KDUERXU FROQLHV RI + S\ORUL WKH DGXOW SRSXODWLRQ XQGHUWDLQW\ UHJDUGLQJ WKH DQWLFLSDWHG LQIHFWLRQ LQ WKH FDXVDWLRQ RI FKURQLF DQG SHSWLF XOFHU GLVHDVH

+ S\ORUL RUJDQLVPV DUH ZRUOGZLGH FRQFHUQHG SDWKRJHQHVLV RI DFLG SHSWLF XQLYHUVDO GLVVHPLQDWLRQ DORQJ ZLWK IUHTXHQF\ LQ XQLQGXVWULDOL]HG SHUVRQV DQG LV IXQGDPHQWDO JDVWULWLV DQG LV KLJKO\ OLQNHG XOFHUV WKH HQ]\PH XUHDVH ZKLFK WUDQVIRUPV

DPPRQLD DQG FDUERQ GLR[LGH HPS
QHXWUDOL]H WKH DFLG LQ LWV EORVH
WLQ WKH GHDUUDQJH RI JDVWULF EORVH
WKURXJKRXW WKH ZRUOG EXW DERXW
DV\PSWRPDWLF $ERXW RI V\PSWH
FRPSUL SHSWLF XOFHU GLVHDVH
GLVRUGHUV DQG JDVWULF FDUFLQR
SDWLHQWV VXIIHU JURP GXRGHQDO X
VKRZV GHYHORSPHQW RI + S\ORUL
IUHTXHQF\ RI LQIHFWLRQ LQ XQLQ
LQGXVWULDOL]HG 9DULRXV QRQLQYDVLYH
ORQLQYDVLYH PHWKRGV QRZDGD\V H[
SURFHGXUH LQYROYHV SURFHGXUH
FXOWXUH PLFURVFRSLF H[DPLQDWLRQ
HQGRVFRSLF ELRSV\ IURP VXVSHFWHG
7KH LQYDVLYH SURFHGXUHV DUH WL
FRQVXPLQJ DQG QHHG D VSHFLPHQ SU
SDWLHQW GLFWDWHV XUHD E\ PLFR
DQG VR VPDVKHG GXULQJ 7KHVH
QRQLQYDVLYH PHWKRGV DUH XUHD E
LQJHVWLRQ RI FDUERQ LVRWRSH XU
UHFRJQLWLRQ RI VHUXP DQWLERGL
VHURORJLFDOO\

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7KLV UHWURVSHFWLYH FRPSDUDWLYH VWXG\ ZDV FRQGXFWHG LQ WKH 3DWKRORJ\ DQG 0HGLFLQH 5RVKDQ 0HGLFDO &ROOHJH 7DQGR 6DGDP JXUP $XJXVW WR 'HFHPEHU RQ RQH KXQGUHG FDVHV RI + S\ORUL LQIHFWLRQ DQG RQH KXQGUHG FRQWURO FDVHV RI DOO DJHV DQG VH[KDYLQJ V\PSWRPV RI G\VSHSVLD RU FOLQLFDOO\ VXVSHFWHG FDVHV RI DVVRFLDWHG JDVWULWLV &DVHV GHQXGDWHG RU XOFHUDWHG PXFRVD RU VDPSOHV KDYLQJ DXWRO\WLF HIIHFWV 3DWLHQWV ZLWK D KLVWRU\ RI XVLQJ QRQ VWHURLGDO DQWL LQIODPPDWRU\ GUXJV H[WLUSDWH WUHDWPHQW ZHUH RPLWWHG IURP WKH VWXG\ $ VWUXFWXUHG SURIRUPD ZDV IRUPXODWHG WR EH FRQFOHFWLQJ DOO WKH GHPRJUDSKLF (QGRVFRSLVWV DOVR QRWHG FOLQLFDO MXGJPHQWV DQG DSSURSULDWH WUHDWPHQW ZHUH RPLWWHG $ VWDQGDUG SURWRFRO ZDV IROORZHG IRU DOO FXUUHQW VWXG\ FRPSDUHV WKH IRQGLQJ UHFRJQL]LQJ + S\ORUL LQIHFWLRQ ZLWK VHFLILFLW\ DQG VHQVLWLYLW\

*DVWULF HQGRVFRSLF PLFURVFRSLF + (DQG *LHPVD VWDLQ

5DSLG ,PPXQRFKURPDWRJUDSKLF + S\ORUL DQWLJHQ IURP IDHFDO PDWHULDO

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$PRQJ FDVHV RI JDVWULF ELRSV\ ZHUH GHWHFWHG PLFURVFRSLFDOO\ H[DPLQHG XQGHU D PLFURVFRSH *LHPVD VWDLQV 7KHVH FRPSULVH IHDOHV 7KH DJH RI WKH UDQJHG IURP WR \HDUV ZLWK D PHDQ RI 7DEOH , 7KH IUHVK IDHFDO VSHFLPHQ ZDV REWDLQHG FDVHV LQ D VWHULOL]HG FRQWDLQHU

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*DVWULF ELRSVLHV $QDO\VDO	)HPDOH	*UDQG 7RWDO
$JH *URXS	7RWDO	7RWDO
3RVLWLYH		
3RVLWLYH		
3RVLWLYH		
1HJDWLYH		
7RWDO		

+=Low, ++=Medium , +++=Higher

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+ S\OR5RWRO $QWLJHQ 0DOH	)HPDOH	*UDQG7RWDO
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ZDV LVRODWHG E\ LPPXQRFKURPDW
FRQILUPHG LQ VXEMHFWV 7KH V
GHWHFWHG LQ 6XOHPDQ ZDVSHUJRUPHG 7KHVSHFLILFL
DQG VHQVLWLYLW\ RI VWRRO DQWLJHQ $GGP JURP $XJXVW WR 3F WHG ZDV
7DEOH VKRZV WKH UHVXOWV RI JDVW 6WRRO $QDO\VLV WR GHWHFW + S\ORU FDVHV RI + S\ORUL FDVHV VH SRVLWLYH ZKROH + S\ORUL VKRZHG +S 2XW RI QHJDWLYH FDVHV RI + S\ORU VKRZHG +S6$ SRVLWLYH ZKOH 7DEOH VKRZV WKH 6HQVLWLYLW\ DQG 6S 16$, RI VWRRO DQWLJHQ WHVW 7KH V DQG RI 7KH VWXG\ WHVW ZDV 6HQVLWLYH DQG 6SHFLILF WR EH +S6$ 1HJDWLYH

7$%/(,9 6(16,7,9,7< $1' 63(&,),&,7< 2) 3<2256722/ $17,*(1 7(67 XVLQJ + S6$ 3RVLWLYH 1HJDWLYH

3RVLWLYH	E
1HJDWLYH F	G

Sensitivity = a/(a+c)×100 = 52.22% Specificity = d/(d+b)×100 = 80%

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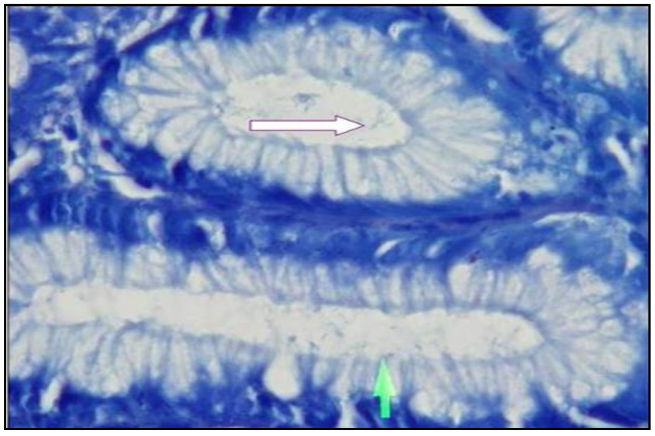

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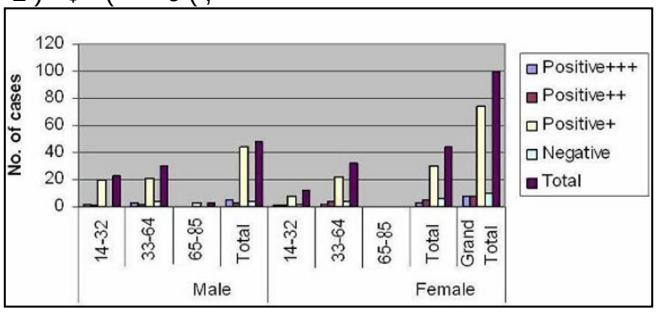

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2YHU WKH SDVW \HDUV RI WKH KLVWRU\ RI HQGRVFRS\ LW KDV EHHQ EURDGO\ PHUJHG WR LGHQWL\ XSSHU ,7 FRQGLWLRQV PDLQ H[SODQDWLRQ IRU WKH H[FXUVLRQ RI HQGRVFRSLF H[DPLQDWLRQ LV WR &21&/86,21 XOFHU GLVHDVH 7KH QRQLQYDVLYH LQYHVWLJDWLRQV IRU + S\ORUL KDYH SURYHG WR EH D YDOXDEOH SURJQRVWLF WRRO HQGRVFRSLF MXGJPHQW LQ PDQDJLQJ GLVHDVH WKH FXUUHQW VWDWXV RI WKH LVRODWLRQ RI + S\ORUL WKH FXOWXUH LV VWLOO WKH JROG VWDQGDUG WHFKQLTXH +RZHYHU LW UHTXLUHV DQG SURSHU LQDFFXUDF\ LQ WKH VWRUDJH DQG WUDQVSRUW RI VR KLVWRORJLFDO WHVWLQJ LV EHOLHYHG WR EH VWDQGDUG LQ LGHQWLI\LQJ + S\ORUL SURFHVV GHSHQGV RQ LGHQWLILFDWLRQ WKH FD LQIHFWLRQ LV LQ SDWFKHV DQG VDPSOLQJ HUURUV PD\ RFFXU HIIHFWLYH DERYH WKH RQWRJHQLF DVSHFWV RI HQGRVFRSLF ELRSV\ 3DWKRORJLVWV VKRXOG EH DZDUH DQG OHDUQ H[SHQ

PLVVHG RQ ELRSV\ (Q RXU VWXG\ RXW RI FDVHV JDVWULF ELRSVLHV ZHUH ODEHOOHG RUJDQLVPV DQG WKH UHPDLQLQJ QHJDWLYH WKLV ILQGLQJ DWWHVWH SUHYLRXV QDWLRQDO DQG LQWHUQD GHWHFWHG DQG RI SRVLW UHVSHFWLYHO\ RQH QDWLRQDO VWX UHVXOW RI GXH WR XQHYHQ GLVWULEXWLRQ RI FRQGXFWHG RQ HQGRVFRSLF ELRSVLH VKRZHG SRVLWLYH FDVHV IRU + S\ VWDLQ $OWKRXJK RXU VWXG\ FRQFLGHV Z PHQWLRQHG DERYH PRUH VLJQLILFDQ WKHVH LW PD\ EH GXH WR PRUH JDVWURHQWHURORJLVWV SHUIRUPL SURFHGXUHV ORFDWLQJ WKH SURSHU RQH VLGH DQG HGXFDWLRQ RI SDWL JDVWURHQWHURORJLVWV IRU WKHLU E RQ RWKHU VLGH ,Q RXU UHVHDUFK DPRQJ SRVLWLYH ZHUH PDOH 7KHUH LV D VOLJKW YDU RWKHU VWXGLHV OLNH RWKHU ZRUNHU PDOH FDVHV LQ WKH VWXG\ WKH LQYROYHPHQW RI PRUH PDOH SR IXUWKHU UHVHDUFK (QGRVFRSLF ELRSV\ IRU KLVWRSDWKR LV HVVHQWLDO IRU LGHQWLI\LQJ + $OWKRXJK LW LV DQ LQYDVLYH LQFRQYHQLHQW SURFHGXUH LW LV SURYHG WKH JROG VWDQGDUG WHFKQ S\ORUL LQIHFWLRQ ,Q RXU VWXG\ VWRRO H[DPLQDWLRQ Z FDVHV WR UHFRJQL]H WKH DQWLJHQ KLVWRSDWKRORJLFDOO\ SRVLWLYH FD SRVLWLYH RQ WKH LPPXQRFKURPDW $PRQJ WHQ KLVWRORJLFDOO\ QHJDWLY ZH FRQILUP RQO\ FDVHV ZHUH SR VDPSOHV ZHUH QHJDWLYH 7KH SRVLW VHOHFWLQJ DQ LPSURSHU VLWH IR HQGRVFRSLF MXGJPHQW LQ FRQWUDVW D KLJK DQG LV GRFXPHQWHG LQ7KH OL QHJDWLYH SDWLHQWV RXWFRPH SRVLWLYH VXEMHF EHHQ FXUH RI XSSHU ,7 VWXGLHV 7KH QRQLQYDVLYH LQYHVWLJDWLRQV IRU + S\ORUL SURYHG WR EH D YDOXDEOH SURJQRVWLF WRRO WKH H[SHULHQFH RI + S\ORUL LQIHFWLRQ WKH FD WKH LVRODWLRQ RI + S\ORUL WKH FXOWXUH LV WR EH VWLOO JROG VWDQGDUG PHW LQDFFXUDF\ LQ WKH VWRUDJH DQG WUDQVSRUW RI VR KLVWRORJLFDO WHVWLQJ LV EHOLHYHG WR EH VWDQGDUG LQ LGHQWLI\LQJ + S\ORUL SURFHVV GHSHQGV RQ LGHQWLILFDWLRQ WKH FD LQIHFWLRQ LV LQ SDWFKHV DQG VDPSOLQJ HUURUV PD\ RFFXU HIIHFWLYH DERYH WKH RQWRJHQLF DVSHFWV RI HQGRVFRSLF ELRSV\ 3DWKRORJLVWV VKRXOG EH DZDUH DQG OHDUQ H[SHQ

(WKLFDO 3HUPLVVLRQV 5RVKDQ 0HGLFDO &ROOHJH 7DQGR $GDP 6LQGK DSSURYDO &RQIOLFW RI ,QWHUHVW &RQIOLFW RI LQWHUHVW WR GHFODUH

)LQDQFLDO 'LVFORVXUH 7KH DXWKRUV KDYH QR IXQGLQJ DJHQF\ WR UHSRUW IRU WKLV VWXG\

'7 6+$5,1* 67$7(0(17 7KH GDWD VXSSRUWLQJ WKLV VWXG\ V ILQGLQJV DUH DYDLODEOH RQ UHTXHVW IURP WKH FRUUHVSRQGLQJ DXWKRU 7KH GDWD DUH QRW SXEOLFO\ DYDLODEOH GXH WR SULYDF\ RU HWKLFDO UHVWULFWLRQV

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6RRPUR 5$ 0DLQ LGHD DQG FRQFHSWXDOL]DWLRQ .DOHHP 0 &ROOHFWLRQ DQG DFTXLVLWLRQ RI GDWD 4D]L 5$ 'HVLJQ LQWHUSUHWDWLRQ RI GDWD ,UVKDG) $QDO\VLV DQG LQWHUSUHWDWLRQ RI UHVXOWV =DIDU 0 &RPSLODWLRQ DQG ILQDO DSSURYDO RI PDQXVFULSW FROOHFWLRQ

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6DEEDJK 3 0RKDPHG ; -DYDQXDE 0 %DED]DGHK $ .RSSROX 9 9DVLJHSDWR 'LDJQRVWLF PHWKRGV IRU +HOLFREDFWHU S\ORUL LQIHFWLRQ LGHDOV RSWLRQV DQG &OLQ 0LFURELRO ,QIHFW 'LV GRL

.DUNKDK $ (EUDKLPSRXU 6 5RVKDQ .RSSROX 9 'DUYLVK 6 .ULVKQD +HOLFREDFWHU S\ORUL HYDVLRQ VWUDWHJLHV LQQDWH DQG DGDSWLYH LPPXQH UHVSRQVHV DQG GHYHORS JDVWURLQWHVWLQDO 5HV GRL M PLFUHV

)RUEHV .-)DQJ = 3HQQLQJWRQ YDULDWLRQ RI WKH +HOLFREDFWHU S\ORUL IOD$ DQG IOD% LWV FRQVHTXHQFHV VFKHPHV DQG SRSXODWLRQ VWUXFWXUHV OQIHFW GRL V

.XQD / -DNDE - 6PROXFL 5 15DJKHY $ 6PROL 0 3HSWLF 8OFHU 'LVHDVH $ %ULHI 5HYLHZ RI &RQYHQWLRQDO 7KHUDS\ DQG 2SWLRQV - &OLQ 0HG GRL MFP

*UHHQEHUJ 5(%DQN 6 7KH SUHYDOHQFH RI +HOLFREDFWHU SORUL LQIHFWLRQ ,QWHUQ 0HG GRL DUFKLQWH

%HUJHU $ 6FLHQWLVWV GLVFRYHU KRZ KHOLFREDFWHU VXUYLYHV JDVWULF DFLG %0-

&DL 3DXO 1 (SLGHPLRORJ SDWKRSK\VLRORJ\ RI +HOLFREDFWHU FKLOGUHQ ,QGLDQ - 3HGLDWU GRL

+DVRVDK 0 $FFXUDF\ RI LQYDVLYH DQG QRQLQYDVLYH GLDJQRVWLF WHVWV IRU +HOLFREDFWHU LQIHFWLRQ 6DXGL - *DVWURHQWHURO GRL VMJ 6-*B B

$QL $ (YDOXDWLRQ RI (OLVD IRU WKH GLDJQRVLV RI +HOLFREDFWHU S\ORUL LQIHFWLRQ LQ GLIIHUHQW DJH JURXSV DQG LWV FRUUHODWLRQ ZLWK KLVWRSDWKRORJLFDO ILQGLQJV 7HFKQRO ,2, LMVV Y L

$7% 'LDJQRVWLF DFFXUDF\ RI WKH 1RQ,QYDVLYH 7HVWV DQG 7KHLU &RUUHODWLRQ ZLWK +LVWRORJ\ $SSURDFKHV 3DWKRJ GGRL

$ +HOLFREDFWHU S\ORUL FDXVHV PLFURELRORJLFDO DSSHDU GRL M

-DQHU PLFURELRORJLFDO DSSHDUDQFHV DQG 1RQ 0LFURELRORJLFDO 7HFKQLTXHV IRU 'HWHFWLRQ RI +HOLFREDFWHU S\ORUL ,QIHFWLRQ 0RGHUQ 3DWKRO GRL

$ 6XUYH\ RI $PXOWLSOH 3URFHGXUH 8VH LQ 3DWLHQWV 8QGHUJRLQJ *DVWURHQWHURORJLFDO 3URFHGXUHV *DVWURHQWHURO GRL

6DWWL 6$ 6DHHG) 6DUZDU 0 (WLRORJLFDO WHVWLQJ SURWRFROV IRU +HOLFREDFWHU S\ORUL LQIHFWLRQ LQ GLIIHUHQW SRSXODWLRQV DQG VHWWLQJV 7]X &KL 0HG

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6 2ZHQ 5- 1RQLQYDVLYH GLDJQRVLV RI *XHOO 0 HW DO (YDOX
+HOLFREDFWHU S\ORUL LQIHFWLRQ LQ GXWWHG WKH GHWHFW
SDWLHQWV E\ VWRRO DQWLJHQ GHWHFWLRQ GLDJQRVLV +HOLFREDFWHU S\ORUL L
LPPXQRFKURPDWRJUDSK\ WHVW SURVSHFWLYH ZLWK XSSHU JDVWURLQWHVWLQDO
DOWHUQDWLYH WR FRQYHQWLRQDO (/,6$ NLW 3KDUPDFR 7KHU GRL
3W M [
*LVEHUW -3 7UHSHUR 0 &DOYHW ; 0HQGR]D -

AUTHOR AFFILIATION:

Dr. Rasheed Ahmed Soomro
(Correspondence Author)
Associate Professor, Department of Pathology
Suleman Roshan Medical College
Tando Adam, Sindh Pakistan.
Email: ralumhs@hotmail.com

Dr. Muhammad Kaleem
Assistant Professor, Department of Medicine
Suleman Roshan Medical College
Tando Adam, Sindh Pakistan.

Dr. Riaz Ahmed Qazi
Professor of Pathology
Suleman Roshan Medical College
Tando Adam, Sindh Pakistan.

Dr. Faisal Irshad
Associate Professor, Department of Pathology
Suleman Roshan Medical College
Tando Adam, Sindh Pakistan.

Dr. Mehwish Zafar
Assistant Professor, Department of Pathology
Suleman Roshan Medical College
Tando Adam, Sindh Pakistan.

Dr. Moin-ul-Islam
Assistant Professor, Department of Surgery
Suleman Roshan Medical College
Tando Adam, Sindh Pakistan.

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